



Course Outline

MSCI2060

Coral Reefs in a Changing Climate

School of Biological, Earth and Environmental Science

Faculty of Science

Winter Term (T2C), 2024



1. Staff

Position	Name	Email	Consultation times and locations
Course Convenor	Ass Prof. Alex Sen Gupta	a.sengupta@unsw.edu.au	On request, please email
Lecturer	Prof. Moninya Roughan	mroughan@unsw.edu.au	On request, please email
Lecturer	Prof. Adriana Verges	a.verges@unsw.edu.au	On request, please email
Lecturer	Dr. Mariana Mayer Pinto	m.mayerpinto@unsw.edu.au	On request, please email
Lecturer	Prof. Tracy Ainsworth	tracy.ainsworth@unsw.edu.au	On request, please email

2. Course information

Units of credit: 6

Pre-requisite(s): None

Teaching times and locations: This is an intensive course taught in the winter term (T2C).

This is an intensive winter term (T2C) 6 UoC course involving blended online and face-face delivery. The teaching period runs from 12 Aug - 6 Sep. During this period there will be a 5-day field trip on Heron Island in the Great Barrier Reef (ladyelliott.com.au), arriving on LEI on 26th August and leaving again on 31st August*. For specific information on travel to/from Heron Island see Appendix 1.

Most of the online activity learning will take place in the period prior to the field trip.

Working hours

While working times and hours will vary depending on the student, as an intensive 6UoC course running for 4 weeks between 12 Aug - 6 Sep, expected workload is approximately 7 hours per working day during both self-guided (online) and facilitated field trip components of the course. NB This comes to approximately 140hrs total. Workload expectations for a standard in-term 6UoC course is 150hrs.

*Please note, additional costs associated with the field trip will be incurred including return airfare to Heron Island (LEI), accommodation and food.

<http://www.timetable.unsw.edu.au>

2.1 Course summary

Tropical coral reefs are some of the world's most diverse and important ecosystems. However coral reefs are also very sensitive to environmental change.

Over the last few years, we have seen mass bleaching events and unprecedented levels of coral mortality around the world. Like many other ecosystems, coral reefs are under threat from a warming and acidifying ocean, as well as other local stressors. To protect against future damage, we need to understand these threatened ecosystems, how they are affected by the physical and chemical environment, and how threats can be reduced by global and/or local action.

The course will cover multi-disciplinary subjects related to coral reef systems in a changing environment, including:

- The Coral Reef environment, formation, key physical and chemical processes
- Key ecosystem concepts (classification, ecosystem function, services, food webs, interactions) as they relate to coral reefs
- Corals and coral reef species, their interactions and functions
- Fundamentals of climate science, including oceanography and climate change
- Impacts of climate change and other threats on coral reef systems
- Dealing with change: local and global solutions to mitigate, adapt to or manage climate change

2.2 Course aims

The course aims to introduce you to the fundamental concepts of ecology, oceanography, climate science and environmental management focussing on a socially, environmentally, and economically important case study: coral reef systems and how they are impacted by anthropogenic climate change. This will be achieved through:

Initial formative on-line learning through a series of expert interviews, video presentations, online modules, and tutorials, with formative and summative quizzes to measure your progress.

Direct observation, experimentation, guided learning and interaction with ecosystem and environmental scientists at a Coral Reef site situated in the Great Barrier Reef.

2.3 Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Explain physical and chemical processes that characterise coral reef environments
2. Identify key species on coral reefs, understand how they are categorised and describe their life cycles
3. Explain key ecological concepts as they apply to coral reefs including food webs, ecosystem function and services, habitat zones, types of species interactions
4. Explain how global and local as well as anthropogenic and natural factors affect coral species and their habitat
5. Explain the fundamentals of anthropogenic climate change, its observed and predicted impacts on the reef system
6. Explain important physical reef characteristics related to reef formation and regional oceanography
7. Identify and justify local and global strategies to mitigate or adapt to climate change and other threats
8. Apply the scientific method, including the development of a sampling strategy, data collection and data analysis to analyse the coral reef environment & ecosystems
9. Demonstrate the ability to analyse and interpret real world data pertaining to reef systems
10. Demonstrate skills in working as a group to achieve scientific understanding
11. Communicate scientific results in oral and written formats

3. Strategies and approaches to learning

3.1 Learning and teaching activities

To build up your background understand of the reef environment and challenges facing the reef, you will begin with the online learning component of the course. There will be a number of recorded interviews with researchers answering questions about coral reef ecosystem and environment, threats and ways to manage those threats. These will be linked to further reading exercises, online modules (for example you might be guided through how to analyse some data and form some conclusions) and assessed online quizzes.

An additional component of the course is a media article that you will prepare. This not only helps you learn about effective science communication but will teach you the importance of assessing and providing feedback on other students work.

The primary mode of learning on Heron Island will be by experiencing the coral reef environment in person through your own observations, guided reef walks, guided snorkel (this is not compulsory, but we can help students that haven't snorkelled before or who are not comfortable in the water), field experiment and by discussing with the team of coral, climate and ecosystem experts who will be on the island with you. In addition to the outdoor activities there will be lectures, tutorials and group study sessions. We strongly encourage you to interact and ask questions of the academic staff who will be with you for the 5 days and are all active researchers interested in coral reefs.

Central to the field trip will be a field experiment. Here you will need to work as an effective group to collect, analyse and understand your data, and to communicate your findings to the rest of the group.

3.2 Expectations of students

The field trip component of this course is compulsory as is engagement with/attendance at all of the main activities: reef walk, field experiment, on-island lectures, off-island online modules.

We encourage you to work with your peers during on-island and off-island activities, however final assessed work must be your own.

IMPORTANT:

The field trip takes place at Heron Island Research Station and other guests may be in attendance. You will be required to behave appropriately and follow the rules below. Unacceptable behaviour (as deemed by academic or marine station staff) will result in you being sent off the island (no refund will be provided). In addition, your home institution will be informed of the actions and underlying reasons.

- **Be respectful to other guests and island staff**
- **Be respectful of each other**
- **Be respectful of the academic staff**
- **No excessive alcohol use. As a paying island guest, you will have access to the resort bar and drink in moderation, but drunken behaviour will not be tolerated**
- **No alcohol to be brought to the island**
- **No entry of the water after consumption of alcohol**
- **Follow all the island rules (these will be explained at the island orientation)**

4. Course schedule and structure

Briefings and on-island timetable are subject to change depending on weather and/or other unforeseen circumstances.

Date	Activity [Learning opportunity]	Assessments
Week 1 (starting 12th Aug)	Self-paced online modules	Complete online material
Week 2 (starting 19th Aug)	Self-paced online modules	Complete online material
27th August		Hand in Media article
Late week2 (TBA)	<ul style="list-style-type: none"> • Pre island briefing at UNSW/sign safety and terms statement • Lecture: Dangerous Animals!!! • Make your own way to Hervey Bay <p><i>Detailed information will be sent to you in good time prior to departure with information on travel information and what to bring.</i></p>	NB we will try to arrange an in person meeting during week 2, so that you can meet your fellow students and the lecturers
26th Aug	<ul style="list-style-type: none"> • Make your own way to Gladstone • Boast from Gladstone to Hervey Bay • Island Briefing • Reef inhabitants and functions (Guided Reef Walk) • Evening: Meet the lecturers 	
27th Aug	<ul style="list-style-type: none"> • Lecture 1, 2 & 3 • Guided snorkel (optional activity) • Field project: project planning, experiment preparation and risk assessment Evening: Coral Reef Trivia 	Hand in Reef report
28th Aug	<ul style="list-style-type: none"> • All day Field experiment 	
29th Aug	<ul style="list-style-type: none"> • Lecture 4, 5 & 6 • Group work (field project data analysis) • Free time 	
30th Aug	<ul style="list-style-type: none"> • Lecture 7 & 8 • Group work • Sampling the coral (lagoon snorkel) • Evening: Group presentations 	Group presentation
31st Aug	<ul style="list-style-type: none"> • 2hr project report writeup • Travel to Hervey Bay • Travel to Sydney 	Individual report writeup
2-6 Sept	<ul style="list-style-type: none"> • Complete any remaining online modules 	Complete peer review of media article
2nd Sept		Complete final quiz

Other Activities

While on the island we will also provide guided snorkels to introduce you to the diverse array of species on the reef

Divers may have the opportunity to go on a dive with the resort dive masters, as long as it does not clash with timetabled learning activities (additional cost)

There may be other island run activities that you may have access to.

There will be a number of evening activities organised by the staff.

5. Assessments & Activities

There are 4 primary assessment tasks in this course that are designed to enable you to demonstrate that you have achieved the course learning outcomes. Completion and submission of all assessment tasks by 5pm on the due date are necessary to receive a final mark in the course. Late submissions without approved Special Considerations will be subject to a 10% per 24hr penalty of the assessment task weighting. Dates are subject to modification

	ASSESSMENT TASKS (title/type and a brief description of the task)	DUE DATE	WEIGHTING	CLO(s)	FEEDBACK	
					TYPE	DATE
1	Reef Report: After the Coral Reef Lagoon walk, students are required to write an individual report identifying and describing 3 reef species. (~700-word, plus any diagrams)	27th Aug	10%	1,2,3	Mark & brief comments	1 st Sep
2	Field Project: In a group of ~7 students supported by a staff member, students will develop a hypothesis about the reef environment or ecosystem, design a suitable experiment, conduct the experiment, collect and analyse the data, and draw conclusion on the hypothesis. Assessable work include: a) Group presentation (15 minutes, plus 5 minutes Q&A) b) Individual report (~1500 words, plus any diagrams)	30 th Aug 31 st Aug	6% 20%	8,9,10	Mark & brief comments	12 th Sep
3	Science Media Output: a) Selection of topic: Students select a topic from a given list (can discuss ideas with staff if necessary) b) Media Output: Pre-field trip, students will research the topic and prepare a short news-style report in a media of their choice (short print or web article: max 900 words + figures) c) Peer review: Each student will be randomly allocated a small number of media outputs to review, mark the outputs and provide feedback for improvement. Peer review quality will be marked by the convenor.	Early wk 1 24 th Aug 3rd Sept	0% 6% convenor mark 6% peer mark	4,11	Verbal, individual feedback brief staff & student comments & final mark	Instant 12th Sept
4	Online quizzes: a) Formative quizzes: These quizzes are integrated in the online modules to assess foundational concepts. (NB Full marks will be given for first time correct answers, decreasing marks will be given for multiple attempts)	Self-paced mainly in Wk 1&2, but must be completed by 6 th Sept	35%	1-7,9	Automatic feedback on incorrect answers	After students have submitted the quizzes
	b) Final test: Summative test to assess contents learnt both on and off island	2nd Sept	12%		Final mark	12th Sept

6. Academic integrity, referencing and plagiarism

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism.

Further information about referencing styles can be located at <https://student.unsw.edu.au/referencing>

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect, responsibility and courage.¹ At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.

Further information about academic integrity and **plagiarism** can be located at:

- The *Current Students* site <https://student.unsw.edu.au/plagiarism>, and
- The *ELISE* training site <http://subjectguides.library.unsw.edu.au/elise/presenting>

The *Conduct and Integrity Unit* provides further resources to assist you to understand your conduct obligations as a student: <https://student.unsw.edu.au/conduct>.

7. Readings and resources

Will be provide via *Moodle* at course commencement

8. Administrative matters

BEES School office: bees@unsw.edu.au

Study Abroad office: exchange@unsw.edu.au

Handbook entry: <https://www.handbook.unsw.edu.au/undergraduate/courses/2020/MSCI2060>

Timetable entry: <http://timetable.unsw.edu.au/2020/MSCI2060.html>

9. Additional support for students

- The Current Students Gateway: <https://student.unsw.edu.au/>
- Academic Skills and Support: <https://student.unsw.edu.au/academic-skills>
- Student Wellbeing, Health and Safety: <https://student.unsw.edu.au/wellbeing>
- Disability Support Services: <https://student.unsw.edu.au/disability-services>
- UNSW IT Service Centre: <https://www.it.unsw.edu.au/students/index.html>

¹ International Center for Academic Integrity, 'The Fundamental Values of Academic Integrity', T. Fishman (ed), Clemson University, 2013.

Appendix 1: Heron Island Field Trip Information

Field trip dates: 26th to 31st August 2024

Field trip cost AU\$1060 to \$1100

This includes

- Catered food:
 - Breakfast Cold and Hot selection
 - Morning tea House made cakes, biscuits, Muffins etc
 - Lunch Buffet Style
 - Afternoon tea Selection of seasonal fruits
 - Dinner Two course
 - Access to tea coffee hot chocolate etc
- Accommodation in shared student bunk rooms
- Return catamaran between Gladstone and Heron Island
- Science facilities including equipment and research boat

Not included

- Flights to/from Gladstone and any accommodation in Gladstone before or after the field trip. This must be organised and paid for by students. At the time of writing return flights are from AU\$550
- Scuba diving. There may be opportunities for scuba diving organised through Heron Island Resort (more information closer to the time)

Island transfer

- You must be at Gladstone Marina by 8.30am on Monday 26th August for a 9.30 departure. (If you miss the boat there won't be another until Wednesday morning) [or you can pay to take the Helicopter!]
- Travel time on catamaran 2 hours.
- Station guests are limited to two bags of personal items (excess baggage charges apply).
- We expect most students to fly to Gladstone the previous day
- Return from Heron Island will be at 12.45pm, arriving at Gladstone at 3pm